



AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A computer-readable medium having computer-executable instructions for communicating between an application and a multipoint processing module adapted to mix, switch, and process media streams, the multipoint processing module having at least one audio processor module for processing audio data in a multipoint conference and at least one video processor module for processing video data in a multipoint conference, the computer-executable instructions performing the step of:

exposing at least one application program interface by the multipoint processing module to receive a request from the application to command the multipoint processing module to modify its a default operation of the multipoint processing module to alter at least one attribute of at least one of the audio processor module and video processor module, the application program interface for interfacing software components.

2. (Previously Presented) The computer-readable medium of claim 1 wherein said at least one application program interface comprises an audio interface, the application using said audio interface to request the multipoint processing module to change a routing of at least one audio input stream towards at least one audio output stream.

3. (Original) The computer-readable medium of claim 2 wherein the request is selected from the group consisting of:

a command to retrieve an audio crossbar topology, the audio crossbar topology indicating how a set of audio input streams is being routed to a set of audio output streams;

- a command to change the audio crossbar topology to indicate to the multipoint processing module how the set of audio input streams should be routed to a set of audio output streams;
- a command to retrieve a value of an audio crossbar control parameter;
- a command to set a value of an audio crossbar control parameter;
- a command to retrieve a minimum value, a maximum value, and a default value for an audio crossbar control parameter;
- a command to retrieve a mixing capability and a transcoding capability of the audio crossbar; and
- a command to retrieve an audio level of a list of audio input streams.

4. (Previously Presented) The computer-readable medium of claim 1 wherein said at least one application program interface comprises a video interface, the application using said video interface to request the multipoint processing module to change a routing of at least one video input stream towards at least one video output stream.

5. (Original) The computer-readable medium of claim 4 wherein the request is selected from the group consisting of:

- a command to retrieve a video crossbar topology, the video crossbar topology indicating how a set of video input streams is being routed to a set of video output streams based on a content of associated audio input streams;
- a command to change the video crossbar topology to indicate to the multipoint processing module how the set of video input streams should be routed to a set of video output streams based on a content of associated audio input streams;
- a command to retrieve a value of a video crossbar control parameter;
- a command to set a value of a video crossbar control parameter;

- a command to retrieve a minimum value, a maximum value, and a default value for a video crossbar control parameter;
- a command to retrieve a mixing capability and a transcoding capability of the video crossbar; and
- a command to retrieve a video level of a list of video input streams.

6. (Previously Presented) The computer-readable medium of claim 2 wherein said at least one application program interface further comprises a video interface, the application using said video interface to request the multipoint processing module to change a routing of at least one video input stream towards at least one video output stream.

7. (Previously Presented) The computer-readable medium of claim 6 wherein the request to route at least one audio input stream is selected from the group consisting of:

- a command to retrieve an audio crossbar topology, the audio crossbar topology indicating how a set of audio input streams is being routed to a set of audio output streams;
 - a command to change the audio crossbar topology to indicate to the multipoint processing module how the set of audio input streams should be routed to a set of audio output streams;
 - a command to retrieve a value of an audio crossbar control parameter;
 - a command to set a value of an audio crossbar control parameter;
 - a command to retrieve a minimum value, a maximum value, and a default value for an audio crossbar control parameter;
 - a command to retrieve a mixing capability and a transcoding capability of the audio crossbar; and
 - a command to retrieve an audio level of a list of audio input streams;
- the request to route at least one video input stream is selected from the group consisting of:

- a command to retrieve a video crossbar topology, the video crossbar topology indicating how a set of video input streams is being routed to a set of video output streams based on a content of associated audio input streams;
- a command to change the video crossbar topology to indicate to the multipoint processing module how the set of video input streams should be routed to a set of video output streams based on a content of associated audio input streams;
- a command to retrieve a value of a video crossbar control parameter;
- a command to set a value of a video crossbar control parameter;
- a command to retrieve a minimum value, a maximum value, and a default value for a video crossbar control parameter;
- a command to retrieve a mixing capability and a transcoding capability of the video crossbar; and
- a command to retrieve a video level of a list of video input streams.

8. (Previously Presented) The method of claim 7 wherein said at least one application program interface further comprises a format control interface, the application using said format control interface to retrieve and set an audio format and a video format, the format control interface comprising:

- a command to retrieve a preferred audio and video format for a conference;
- a command to set the preferred audio and video format for the conference;
- a command to retrieve a format structure and configuration capability structure pair of a conference, the format structure and configuration capability structure pair describing an audio and video format supported by the conference;
- a command to retrieve a number of audio and video format structure and configuration capability structure pairs that are available in a conference;
- a command to reorder a list of preferred audio formats; and

a command to reorder a list of preferred video formats

9. (Original) The computer-readable medium of claim 3 wherein the audio crossbar control parameter is selected from a group of audio crossbar control parameters, the group comprising:

- a setting to specify a periodicity of an interrupt service routine;
- a setting to specify a maximum number of mixed input signals;
- a setting to enable and disable silence detection;
- a setting to enable and disable silence compression; and
- a setting to enable and disable automatic gain control.

10. (Original) The computer-readable medium of claim 3 wherein the multipoint processing module disables the command to set a value of an audio crossbar control parameter when a control flag is set.

11. (Original) The computer-readable medium of claim 5 wherein the video crossbar control parameter is selected from a group of video crossbar control parameters, the group comprising:

- a setting to specify a first time to evaluate whether a speaker is continuing to speak;
- a setting to specify a second time during which a speaker and a video switching process can not be taken over by a second speaker; and
- a setting to specify a third time, the third time being the time when a switch is made and when a fast update request is sent to the speaker's system.

12. (Original) The computer-readable medium of claim 5 wherein the multipoint processing module disables the command to set a value of a video crossbar control parameter when a control flag is set.

13. (Previously Presented) A method to communicate between a media service provider component and a multipoint processing module adapted to mix, switch, and process media streams, the multipoint processing module controlling an encoder module and a decoder module for processing video data in a multipoint conference, the method comprising the step of:

exposing at least one application program interface by one of the media service provider component and the multipoint processing module to communicate commands and indications between the media service provider component and the multipoint processing module.

14. (Previously Presented) The method of claim 13 wherein said at least one application program interface further comprises a pin interface, the multipoint processing module using said pin interface to retrieve a direction and crossbar positional index of one of the audio streams and video streams.

15. (Previously Presented) The method of claim 13 wherein said at least one application program interface further comprises a decoder interface to handle decoder commands, the decoder interface comprising:

a command to complete updating a video frame and display the video frame until commanded to release the video frame; and
an indication of a video temporal and spatial trade-off of the encoder.

16. (Previously Presented) The method of claim 13 wherein said at least one application program interface further comprises an encoder interface to send encoder commands to the encoder, the encoder interface comprising:

a command to enter a fast-update mode;
a command to perform a fast update of a group of blocks;
a command to perform a fast update of a macroblock;
a command to use sync for every group of blocks;

an indication that a set of macroblocks has been received with errors and has been treated as not coded; and
a command to set a relative tradeoff between a high spatial resolution and a high frame rate.

17. (Original) The method of claim 13 wherein the multipoint processing module has a video pin, said at least one interface further comprises a network statistics interface to communicate network characteristics between the video pin and to the media service provider component, the network statistics interface comprising:

a command to inform the video pin of error channel conditions;
a command to supply the media service provider component the error channel conditions;
a command to retrieve values of the error channel conditions with which the video pin may be setup, the values including a minimum value, a maximum value, a default value, and a support value;
a command to inform the video pin a channel packet loss rate;
a command to supply the media service provider component the channel packet loss rate; and
a command to retrieve values of the channel packet loss rate with which the video pin may be setup, the values including a minimum value, a maximum value, a default value, and a support value.

18. (Original) The method of claim 13 wherein the multipoint processing module has a video pin, said at least one interface further comprises a bandwidth interface comprising:

a command to specify an upper limit in bandwidth transmission of the video pin;
a command to retrieve the video pin's upper limit in bandwidth transmission;

a command to retrieve values of the upper limit in bandwidth transmission with which the video pin may be setup, the values including a minimum value, a maximum value, a default value, and a support value;

19. (Original) The method of claim 13 wherein the multipoint processing module has a video pin, said at least one interface further comprises a frame rate control interface comprising:

a command to specify a video frame's average display time to the video pin;
a command to retrieve the video frame's average display time;
a command to retrieve values for the video frame's average display time with which the video pin may be setup, the values including a minimum value, a maximum value, a default value, and a support value.

20. (Original) The method of claim 13 wherein the multipoint processing module has a video pin, said at least one interface further comprises an RTP packet interface comprising:

a command to adjust a maximum RTP packet size generated by the video pin;
a command to supply the media service provider component the maximum RTP packet size; and
a command to retrieve values for the maximum RTP packet size with which the video pin may be setup, the values including a minimum value, a maximum value, a default value, and a support value.

21. (Previously Presented) A multipoint processing accelerator apparatus for transmitting audio and video data over a plurality of channels in a multipoint conference being controlled by an application, the application controlling the apparatus by an application program interface of the apparatus, the apparatus comprising:

at least one hardware module having a default operation for applying signal processing operations to at least one of the audio and video data; and

a minidriver, said minidriver communicating with the application through at least one property set to do one of receiving a command to modify the default operation of the at least one hardware module and sending a command to the application.

22. (Original) The apparatus according to claim 21 wherein the at least one property set comprises an audio topology property set.

23. (Original) The apparatus according to claim 22 wherein the audio topology property set comprises:

- a property to do one of updating an audio crossbar content and retrieving an audio crossbar content;
- a property to retrieve mixing and transcoding capabilities of an audio crossbar;
- a property to do one of setting a periodicity of an interrupt service routine and getting a periodicity of an interrupt service routine;
- a property to do one of setting a maximum number of mixed input signals and getting a maximum number of mixed input signals;
- a property to do one of enabling silence detection and disabling silence detection;
- a property to do one of enabling automatic gain control and disabling automatic gain control; and
- a property to retrieve a value of an audio level of a list of audio input streams.

24. (Original) The apparatus according to claim 21 wherein the at least one property set comprises a video topology property set.

25. (Original) The apparatus according to claim 24 wherein the video topology property set comprises:

- a property to do one of updating a video crossbar content and retrieving a video crossbar content;

- a property to retrieve picture composition capabilities of the video crossbar;
- a property to do one of setting a periodicity of an interrupt service routine and getting a periodicity of an interrupt service routine;
- a property to do one of setting a time to evaluate whether a speaker is continuing to speak and getting a time to evaluate whether a speaker is continuing to speak;
- a property to do one of setting a second time during which a speaker and a video switching process can not be taken over by a second speaker and getting a second time during which a speaker and a video switching process can not be taken over by a second speaker; and
- a property to do one of setting a third time and getting a third time, the third time being the time when a switch is made and when a fast update request is sent to the speaker's system.

26. (Original) The apparatus according to claim 21 wherein the at least one property set comprises a decoder property set.

27. (Original) The apparatus according to claim 26 wherein the decoder property set comprises:

- a property to specify that a video frame update be completed and a video frame be displayed until receiving a release signal; and
- a property to indicate a video temporal and spatial trade-off of an encoder.

28. (Original) The apparatus according to claim 21 wherein the at least one property set comprises a video encoder send property set.

29. (Original) The apparatus according to claim 28 wherein the at least one hardware module comprises a video encoder, the video encoder send property set comprises:

a property to signal to the application that it needs to send a command to the video encoder.

30. (Original) The apparatus according to claim 21 wherein the at least one property set comprises a stream topology property set.

31. (Original) The apparatus according to claim 30 wherein the stream topology property set comprises:

a property to retrieve a direction and crossbar positional index of a stream.

32. (Original) The apparatus according to claim 21 wherein the at least one property set comprises a video encoder property set.

33. (Original) The apparatus according to claim 32 wherein the video encoder property set comprises:

a property to command a video output stream to enter a fast update picture mode;

a property to command the video output stream to perform a fast update of a group of blocks;

a property to command the video output stream to perform a fast update of a macroblock;

a property to command the video output stream to use sync for every group of blocks; and

a property to provide an indication that a set of macroblocks has been received with errors and has been treated as not coded.

34. (Original) The apparatus according to claim 21 wherein the at least one property set comprises a network statistics property set.

35. (Previously Presented) The apparatus according to claim 34 wherein the network statistics property set comprises:

- a property to do one of informing a video output pin of error channel conditions and supplying a media service provider component the error channel conditions; and

- a property to do one of informing the video output pin of a channel packet rate loss and supplying the media service provider component the channel packet rate loss.

36. (Original) The apparatus according to claim 21 wherein the at least one property set comprises a bandwidth property set.

37. (Original) The apparatus according to claim 36 wherein the bandwidth property set comprises:

- a property to do one of specifying an upper limit in bandwidth transmission to a video output pin and supplying the upper limit bandwidth transmission of the video output pin to a media service provider component.

38. (Original) The apparatus according to claim 21 wherein the at least one property set comprises a frame rate property set.

39. (Original) The apparatus according to claim 38 wherein the frame rate property set comprises:

- a property to do one of specifying a video frame's average display time to a video output pin and supplying the video frame average display time to a media service provider component.

40. (Original) The apparatus according to claim 21 wherein the at least one property set comprises a RTP control property set.

41. (Original) The apparatus according to claim 40 wherein the RTP control property set comprises:

a property to do one of retrieving a maximum RTP packet size and setting the maximum RTP packet size.

42-54. (Cancelled)